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Advanced Small Module Reactor (SMR) R&D Program

Brian K. Robinson
Program Manager

Office of Advanced Reactor Concepts

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Mission and Program Objectives

Program Mission:

- Conduct research, development, and demonstration (RD&D) activities that support the licensing and deployment of advanced SMR designs

Key Program Objectives:

- Support improvements in the safety, performance and economics of SMR designs
- Collaborate with NRC and Standards Developing Organizations (SDO's) to address gaps in codes and standards to support SMR designs
- Conduct evaluations of advanced SMR designs for commercialization potential

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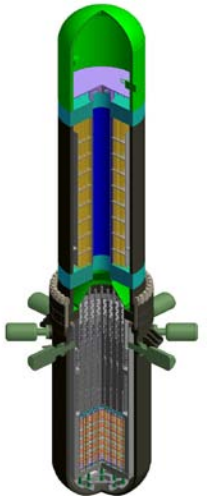
SMR History

- **In FY11, SMR Program**
  - Unable to get underway during Continuing Resolutions(CR)
  - Program considered a “new start”
- **SMR Program divided**
  - Two distinctly different components
    - Advanced SMR R&D ($28 M)
    - SMR Technical Support



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SMR R&D Program Information

- **Organizational plan was developed to:**
  - Redraft the SMR Program Plan with a R&D focus
    - Final draft version is in review
  - Establish FY12 IPL, drafted and in review
  - Solicit National Laboratories for technical input
    - Completed and held a meeting on Feb 29th
  - Establish Work Packages & WBS, in-progress
  - SMR R&D program projected start in April

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SMR R&D Overall Program Structure

- Safety and Licensing
- Component and Technology Development
- Modular Fabrication
- Instrumentation, Controls and Human-Machine Interfaces

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Safety and Licensing

- **SMR Licensing R&D support**
  - A regulatory gap analysis and development of licensing support plan for SMRs
- **SMR site suitability and screening tools**
- **PRA methods for SMR operations, security and safeguards**
  - Cost impact on SMRs; EPZ size and staffing requirements
  - SECY 10-0034
  - SECY 11-0152
- **Analyze need for Utilities Requirement Document**

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Component and Technology Development

- **Materials for advanced SMR concepts**
  - Qualify advanced materials
- **Energy Conversion technology for SMRs**
  - Brayton Cycle
- **Design and Codification Basis for SMR-specific materials**
  - Develop and maintain GEN IV data base to support application of key high temperature materials
- **Material issues for SMR operational environments**
- **High Temperature Design Methodology**

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Modular Fabrication

- **Advanced SMR module fabrication**
  - Activity will focus on the definition of key R&D needs for modular fabrication technology
- **SMR economic assessment models**
  - The model will leverage the G4-ECONS model used in the GIF EMWG to provide better estimates for the levelized cost
  - Generate a “road map” for how the US manufacturing base would achieve large-scale SMR module fabrication
  - University of Chicago Report

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Instrumentation, Controls and Human-Machine Interfaces

- **NEET - Advanced Sensors and Instrumentation**
  - General in application
- **SMR sensors and measurement systems**
  - Monitoring performance in normal and off-normal operation of advanced SMRs
- **Multi-module control room and operations**
  - Development of intelligent interface technologies and innovative concepts of operation for MM SMR plants
- **Supervisory control of multi-module SMR plants**
  - Enable integration of control, diagnostics, and decision processing for highly automated multi-module plant operation

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Next Steps for SMR R&D Program

- **Finalize the SMR R&D Program Plan**
- **Complete management review of the Draft FY12 IPLs**
  - Include establishing FY13 and FY14 IPLs
- **Complete Work Package development**
  - Mid April
  - Complete assigning TALs and & WPM
- **“Live” in April**

QUESTIONS?